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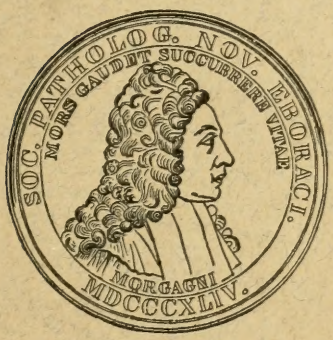
NEW YORK PATHOLOGICAL SOCIETY



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DR. HORST OERTEL, *President.*

A TUMOR OF THE SUBMAXILLARY REGION: A TUMOR OF THE OVARY*

H. S. MARTLAND, M.D.

Dr. H. S. Martland showed a specimen removed at autopsy from a man, thirty-seven years of age, who had died from pulmonary tuberculosis. The specimen included the tongue, larynx, and trachea. At the right of the median line there was an oval, more or less nodular, firm tumor, which was well encapsulated and on gross section had a spongy appearance. The tumor was not vascular, and was light gray in color

*Presented at the meeting of November 10, 1909.

throughout. It lay in the anterior triangle of the neck, and its lower border came just below the bifurcation of the carotids, though it did not straddle the carotid notch nor encircle the arteries. From its microscopical appearance the most probable diagnosis seemed to be perithelioma of the carotid.

In reviewing the literature of carotid gland tumors, an excellent résumé by Keen and Funke was found. Several arguments might be brought forward against the theory that this tumor was one of the carotid gland. It lay anterior and slightly external to the carotid, on the level of the carotid notch. Most of such tumors are described as lying between the external and internal carotids, and often encircling or straddling the notch. It should be remembered, however, that if the growth were glandular it might push upward as it grew and finally lie upon these structures. The tumor was very firm in consistency, and in this particular also differed from most of the carotid tumors, which have been described as of medium firmness. Of course, this would depend largely upon the amount of fibrous tissue and the dilatation of the vessels. The tumor was a light gray throughout, whereas most of the carotid tumors are described as brownish gray to red in color. The tumor was globular in shape, and not lobulated, as are most of the carotid tumors, and no grooves made by the vessels could be found. The microscopical picture, on the other hand, and the presence of red cells among the tumor elements, point to a possible perithelioma of the carotid gland.

The salient points in the clinical history were as follows: The patient first noticed a small lump in the neck when he was twenty-two years of age; for the next two years this grew rapidly, and then for thirteen years remained quiescent; that is, up to the time of his death. The tumor had never caused any pain or discomfort. Before his death the diagnosis of calcified tuberculous glands was made, the mass being a little too high to be considered a cystic or calcified lobe of the thyroid.

Marchand, in 1891, first recognized this tumor; since then

twenty-nine cases were reported up to the year 1906, two of them at autopsy. The increase in the reports of such tumors since 1906, shows that they are less rare than was supposed.

About a year ago, Dr. Martland had had sent to him a tumor which was removed at operation and which proved to be an undoubted perithelioma of the carotid. The patient did well for a time, but died three or four months later from a recurrence at the base of the brain, probably from rests not removed.

The second specimen was a solid ovarian tumor which was removed at operation from a child twelve years of age. The history was as follows: Two weeks previous to admission to the hospital the patient had sharp stabbing pains in the abdomen. Four days before admission the pains had become constant and localized on the right side, and were accompanied by nausea and vomiting. The bowels were very constipated. On palpating the abdomen a large oval mass was felt lying in the median line. This mass was slightly more prominent on the right side than on the left. The blood count showed 20,000 white cells, polymorphonuclears, 86 per cent. A diagnosis of possible appendical abcesses was made, and the appendix was opened. This large mass was found, but the tumor was not removed on account of the extreme weakness of the patient. The acute symptoms were probably due to torsion on the broad ligament. One week later the growth was removed. Adhesions to the great omentum and abdominal wall caused troublesome bleeding, and the patient went into surgical shock. Her condition did not warrant further interference, and a complete operation was postponed for three weeks. At the second operation the left ovary showed no signs of involvment, but three weeks later, when the third operation was performed, the left ovary showed a mass the size of an orange, and there was also extensive involvement of the broad ligament and retroperitoneal glands. The child lived for several weeks after the third operation and died with numerous nodular masses in the abdomen and a pronounced bronchopneumonia.

On gross section the tumor was quite edematous. A large part of the tumor looked like myxomatous tissue, but stained rather deeply and was thought to be edematous connective tissue stroma. There were also large areas in the tumor which resembled hemangio-endothelioma. Whether the blood had ruptured into the spaces or not was not determined. There were besides considerable areas representing smooth muscle; no striated muscle was found. In certain parts there were a great many cysts averaging from 2 to 15 mm. in diameter. These cysts were lined with cuboidal shaped and low cylindrical cells; some contained blood, some nothing but serum. A great part of the tumor, which was grayish or yellowish gray in the gross, microscopically simulated a lymphangio-endothelioma. In some parts typical glandular structures appeared, formed of a single layer of cylindrical cells, the cells being devoid of cilia. The following tissues were not found: cartilage, nervous tissue, fat, striated muscle, and bone.

Discussion:

Dr. F. C. Wood said that although it was difficult to judge of the first case presented by Dr. Martland, without further study, he thought that before making a diagnosis of carotid growth the possibility that this was an ordinary complex tumor of the submaxillary gland should be carefully considered. He thought the presence of cartilage and myxomatous tissue pointed to this diagnosis. The photographs appeared to show ordinary alveoli filled with coagulated matter which stained red with eosin. The carotid tumors which he had seen had been of an entirely different type, showing nothing like this particular specimen.

Dr. Leo Buerger said that he was inclined to agree with Dr. Wood in classing this particular tumor with the mixed cell variety of endothelioma usually found in parotid and submaxillary glands. There seemed to be no question as to the presence of the typical myxomatous and cartilaginous tissue characteristic of these growths. As regards true tumors of the carotid body, he had seen one case. It occurred in a middle aged woman who

was operated upon by Dr. Lilienthal at the Mt. Sinai Hospital in May, 1909. The tumor was about the size of an orange, and was situated at the bifurcation of the carotid artery, being intimately connected with the external and internal carotids and extending upward for a considerable distance towards the base of the skull. The operation was difficult and resection of the common carotid and its two branches had to be done. Microscopically the tumor was a firm fibrous one composed of two main lobules inseparable from the large vessels which were embedded in it. Histologically it was an endothelioma. Although most of the tumors of the carotid body have been reported as being peritheliomas, the fact that chromaffinic cells have been found in them of late seems to throw some doubt upon the previous assumption that the growths are angioblastic. Further study should be directed towards determining whether they do not belong to the neoplasms of the sympathetic system. Dr. Buerger, therefore, wished to ask Dr. Martland whether the reaction for chromaffin cells had been made in his tumor.

Dr. Martland said that the cells of the tumor had failed to give reaction for chromaffin.

The President said that while both of these cases were very interesting and important, it seemed to him, since there was some disagreement as to the diagnosis, that they should be referred to the Committee on Microscopy for further study before the reports were admitted to the records of the Society. He, therefore, requested that Dr. Martland confer with the Committee on Microscopy, and that the committee report at the next meeting.

* * * * *

At the meeting of the Society held on December 8, 1909, Dr. Martland said that after consultation with the Committee on Microscopy he would like to change his diagnosis on the first case which he had presented at the November meeting, and call this an ordinary mixed tumor of the submaxillary gland, probably arising from misplaced submaxillary tissue. The anatomical

position of the tumor was rather low, and this had deceived him as to its nature.

As regarded the second case, a large solid malignant tumor of the ovary in a child of twelve years, which was presented for diagnosis, for the reason that although he had thought it to be teratomatous he wished to know whether it might not possibly be a one or two layer embryoma, Dr. Martland said that the committee had decided that it was probably a three layer embryoma or teratoma.

Dr. F. C. Wood said that from the three sections of the second case which he had seen, while it seemed to him that the epithelial growth did imitate some of the teratomatous tumors, especially those of the testicle, yet he could see only new growth of epithelium. He had found no cartilaginous or other structures which would warrant the diagnosis of teratoma.

Dr. James Ewing said, in regard to this ovarian tumor, that in his judgment it followed the rules laid down for teratoma of the testis and was probably teratomatous. It contained very curious epithelial structures, in some cases approaching the appearance of chorioma, in other places growing diffusely, and in still other places mingling with the stroma, so that in parts it was difficult to determine the line of demarcation between epithelial cells and stroma cells. It contained also cysts lined with high cuboidal cells. The stroma itself was distinctly embryonal. It was formed of mucoid connective tissue with a great abundance of fibroblasts, sometimes so numerous as to approach the standard of sarcoma. It seemed to him that from the general history of ovarian teratomata and the fixed law of predominance of one element in teratomata, the chances were strongly in favor of this tumor being a teratoma.

In regard to the first case, Dr. Ewing thought that one or two points should be emphasized. The first was the long history of the case without operation, the patient dying finally of tuberculosis. Compared with the average course of a parotid gland case, this was rather remarkable. In his laboratory he had notes on the sixth operation on a somewhat similar case extending over

some years. The tendency of these tumors to recur was notorious. Another point was the unusual position of the tumor, which was situated below the inferior maxilla and was closely adherent to one of the carotid arteries, which was unusual for a tumor of the submaxillary gland.

Dr. Wood thought that the recurrence of these parotid tumors was very largely due to the inability of the surgeons to remove the growth completely. If the tumor were free and could be completely extirpated, the result was almost uniformly no recurrence. But most of the tumors were closely entangled with the finer nerves and muscles of the neck, and in these cases there was usually a recurrence. These were sometimes local and quite benign, and the patient might live for many years, the type tending to become more and more sarcomatous with each recurrence.

Dr. R. T. Frank said in regard to the second case, that as far as he could see, Dr. Ewing had spoken of one type of cell which was epithelial in character; that is, resembled chorioma. The cystic growth with high cuboidal epithelium would represent ectoderm. He had understood Dr. Ewing to say that this was a teratoma with but one layer developed.

Dr. Ewing said that he had regarded it as a tridermal structure. He could not feel certain that the cells were really choriomatous, and therefore could not say that they were ectodermal structures.

As there seemed to be some disagreement still among the members of the committee as to the diagnosis of the second case the President again referred the matter to them for further study and report.

* * * * *

At the meeting of the Society held on January 12, 1910, the Committee on Microscopy reported as follows:

The first tumor submitted by Dr. Martland at the November meeting of the New York Pathological Society is a chondro-endothelioma or mixed tumor of the submaxillary gland.

The ovarian tumor is a teratoma of the ovary with carcinomatous changes.

(Signed) Charles Norris
F. C. Wood
J. Ewing, Chairman.

THREE UNUSUAL TUMORS. SARCOMA OF THE STOMACH, ENCHONDROMA OF THE VERTEBRA, AND CARCINOMA OF THE KIDNEY.

ELI MOSCHCOWITZ, M.D.

Dr. Eli Moschcowitz presented three tumors, rather ordinary in type, but of interest because of their unusual locations.

The first was a tumor of the stomach removed from a woman fifty-eight years of age. The history was incomplete, as the patient was practically moribund upon admission to Beth Israel Hospital. She had, however, been treated for ulcer of the stomach at the German Hospital about a month previously. She had remained there for two weeks, and had then been at home for two weeks, when she was suddenly seized with violent pain, and showed typical symptoms of general peritonitis. The diagnosis of perforated gastric ulcer was made, but at operation none could be found. At autopsy, a tumor, the size and shape of a potato, was found situated at the greater curvature of the stomach, near the esophagus, high up under the left lobe of the diaphragm, adherent to the diaphragm on one side and resting on the spleen on the other. The tumor was pedunculated. In the stomach there was a large ulcer about the size of a penny, which led into a long cavity within the tumor. On section, the surface of the growth was white, interspersed with numerous hemorrhagic areas. On microscopical examination, the tumor proved to be a typical spindle cell sarcoma. No metastases were found.

The second case was one of enchondroma of the vertebra, removed from a patient, forty-eight years of age, who was admitted to the Beth Israel Hospital on June 15. About eleven years before his left lower extremity had begun to feel heavy; this heaviness slowly increased for a time, and then, according to the patient, the symptoms entirely disappeared. Some time later the feeling of heaviness returned, and the right lower extremity also became affected; numbness, stiffness, and spasticity developed. He also had pains about the abdomen. During

the three weeks before admission the pains had been excruciating. On physical examination the spastic gait was very pronounced, more especially in the right leg. There were some areas of general hyperesthesia. The sensations of heat and cold were much impaired. Knee jerks were exaggerated. Wassermann and Noguchi tests were negative. At operation a tumor about the size of a pecan nut was found springing from the posterior aspect of the ninth dorsal vertebra, somewhat to the left of the median line. The tumor was smooth and very hard. The patient died two months after the operation, with all the classical symptoms of transverse myelitis. On microscopical examination the tumor proved to be an enchondroma, showing areas of softening and areas of calcification. The spinal cord was compressed to such an extent that practically nothing but dura was left. On microscopical examination the ascending tracts were degenerated above the tumor, the descending below.

The third specimen was removed from a man, fifty years of age, who five years previously had noticed lesions on both legs, which were diagnosed as multiple hemorrhagic idiopathic sarcomata of Kaposi. For a year and a half, he had suffered also from attacks of pain in the right kidney, with occasional hematuria. The urine was full of pus, but no tubercle bacilli could be found. Nephrectomy was performed, and the patient died about a month later. The kidney showed a large pedunculated papillary mass springing from the upper part of the pelvis, about the size of a walnut. On section through the pedicle, infiltration of the kidney by tumor tissue could be seen to a depth of about an inch and a half. The markings of the remaining part of the kidney were practically obliterated. The cut section was smooth and white in color. The capsule was adherent; and the fatty capsule was also adherent. The pelvis of the kidney presented a large number of large tubercles with cheesy contents. There was no ulceration. Microscopically, the tumor was a papillary carcinoma. The kidney was infiltrated throughout with round cells; the tubercles of the pelvis showed the typical changes of tuberculosis. At the autopsy, an old tuberculosis of both apices was found; but there were no metastatic growths.

Discussion:

Dr. Charles Norris asked Dr. Moschcowitz upon what grounds he based his diagnosis in the first case, and how he excluded a primary sarcoma of the perigastric or peripancreatic lymph nodes. Could he exclude a secondary metastatic tumor? The ulcer in this case might have been secondary; the tumor might have ulcerated through the coats of the stomach.

Dr. Moschcowitz said that microscopically the tumor was not of the type usually derived from the lymph nodes. It was a typical spindle cell sarcoma. That the tumor was primary was shown by the fact that at autopsy no other tumor was found.

Dr. Horst Oertel said that he felt rather doubtful as to the sarcomatous character of the growth in this first case. He had not yet seen the microscopic sections, but in the gross it seemed to him to present a good many features which were against such a diagnosis. The growth was apparently well limited; it did not seem to infiltrate the stomach at all, projecting rather to the outside, but without involving the surrounding structures; and no metastases were present; points which were unusual in a primary sarcoma of the stomach. Dr. Oertel asked how Dr. Moschcowitz excluded a possible origin from another source, and whether he was absolutely certain that the tissues represented a sarcoma.

Dr. Moschcowitz said that his diagnosis was based upon the miscroscopical appearances, which were those of typical spindle cell sarcoma. There was in the slides nothing to indicate gumma. As far as the character of the tumor went, it conformed to many tumors of the stomach which had previously been described in the laboratory. Some of these tumors were diffuse, while others were pendulous. As regarded the possibility of a lymphatic origin, this could not be absolutely excluded, but microscopically the tumor was not of the type usually found arising from the lymph glands. The tumor was in intimate relation with the stomach; there was no line of cleavage or any other sign to show that the growth arose from any other organ than the stomach.

Dr. Oertel asked whether the tumor infiltrated the mucous membrane, or whether it had shown any tendency at all toward infiltration.

Dr. Moschcowitz said that the mucous membrane was not infiltrated except at the site of the ulceration; and that the tumor had shown no tendency whatever to infiltrate, except the wall of the stomach.

Dr. A. M. Pappenheimer recalled having performed an autopsy upon an undoubted case of primary sarcoma of the stomach. The subject was a male, forty-two years old. The stomach was occupied by a tumor mass the size of a child's head, presenting within the cavity of the organ, and taking its origin from the fundus. The tumor weighed over three kilos. The growth infiltrated the upper pole of the spleen and the diaphragm at one point; elsewhere the peritoneum was smooth. The internal surface was covered with greenish slough. The tumor consisted of homogeneous, yellowish white tissue, which in places had broken down to form cysts filled with clear fluid. There were several large metastases in the liver, but none of the regional lymph nodes were involved. Microscopically, the tumor consisted of long, slender, tapering cells, arranged in loose bundles and whorls. The nuclei were elongated and frequently had squared ends. The cells stained like smooth muscle fibers, and no intracellular connective tissue fibrils could be demonstrated. In many places the cells were separated by abundant homogeneous ground substance taking a faint eosin stain. The tumor was considered to be a leiomyosarcoma.

Dr. Oertel said that he was still unwilling, on the evidence so far presented, to accept this case as one of primary sarcoma of the stomach. (After examing the microscopic slides, Dr. Oertel took the tumor to be a myoma of the stomach.)

FOUR DIFFERENT CASES ILLUSTRATING RUPTURE OF THE AORTA.

A. K. DETWILLER, M.D.

The following cases of rupture of the aorta seem to be of interest, not only from the standpoint of pathological anatomy, but also as regards the question of how far syphilis enters in as an essential factor in the production of all such cases. While syphilis is usually classed as one of the causes of arterio- or athero-sclerosis, it is frequently associated with a more specific inflammation of arterial disease. Here its effects on the aorta seem to be mainly of the nature of periarteritis and of mesaortitis. These specially definite syphilitic types generally show a somewhat localized distribution. Certain parts of the aorta, most commonly the arch, seem to be particularly susceptible to this process, while the rest of the vessel may, as far as gross appearances go, appear healthy.

In fibrous aortitis, the inner surface of the vessels is characteristically scarred and often puckered with narrow, linear furrows, sometimes showing little pits from which stellate lines radiate. Commonly, there is a very characteristic translucency, due to areas of localized atrophy. Hard patches, sometimes almost cartilaginous in appearance, and of grayish white color, are seen forming round, oval, or irregular areas, more or less raised above the surface. There may also occur white patches of recently formed connective tissue with possibly an entire absence of the ordinary yellowish raised nodules and calcified plaques, so generally seen in atheroma.

Microscopically, syphilitic aortitis begins, according to the present prevalent belief, in the form of granulomatous infiltrations of the adventitia and media along the course of the individual vasa vasorum. These vessels proliferate with the production of newly formed capillaries and other associated evidences of syphilitic inflammations. Accompanying this infiltration, a localized atrophy and final disappearance of the normal elements of the middle coat occur. The elastic tissue layers, especially,

are subject to the most striking and, at the same time, most important change, consisting of a disintegration, fibrillation, and eventual disappearance in those areas where inflammatory cell infiltration has taken place. The destruction of the elastic laminæ must have a very considerable influence in the production of aneurysmal dilatation and in rupture of the aorta.

The first case occurred in a Spaniard, forty-eight years of age, who was admitted to the skin ward, at the City Hospital, on account of multiple small tertiary ulcerations of the scalp of six weeks' duration. He gave a history of hard chancre, seventeen years previously, with a subsequent development of extensive skin eruption. The clinical diagnosis was tertiary syphilis. He was put on potassium iodide and hypodermic injections of salicylate of mercury. Physical examination revealed nothing except punched out ulcers of the scalp and typical syphilitic scars on the legs. The patient was afebrile and felt well; in fact, he had asked to be discharged. He died very suddenly, nine days after admission to the hospital, from a severe hemorrhage, blood flowing freely from his mouth and nose.

The autopsy showed a considerable number of white, translucent looking scars confined to the first and second portions of the arch of the aorta; the thoracic and abdominal parts being well preserved. There was an annular, punched out ulcer communicating with the trachea at the point where they cross each other. The ulcer was circular, its edges somewhat undermined and its base adherent to the subjacent trachea. The perforation was four mm. in diameter, extending from the base of the aortic ulcer into the trachea and through this the fatal hemorrhage had occurred. There was no special aneurysmal dilatation of the arch; this at its widest part measuring only 8.5 cm. in its internal circumference. The stomach was found to be nearly filled with semi-clotted blood and the lungs were in a state of acute emphysema and filled with aspirated blood. The liver showed a gumma and numerous typical syphilitic scars. There was no smooth atrophy of the base of the tongue; this being an example of the extent of the importance which can be attached to the ab-

sence of an often-quoted, most reliable sign of syphilitic disease.

The next case occurred in a large, well developed man, fifty-nine years of age, who previously had been apparently in perfect health. No history was obtainable in this case so that the question of syphilis could not be determined. He died very suddenly in bed, during the night.

At autopsy, the pericardium was found filled with blood. The first portion of the arch of the aorta showed a slight general dilatation. Along its right margin, just at the point where the blood stream is thrown on its new course, while the aorta is still within the pericardial sac, there were two small, slit-like apertures. They were situated in the longitudinal axis of the vessel, being about three mm. long and separated by thin, fibrous tissue, two mm. broad. Through these apertures communicating with the interior of the aorta, the hemorrhage into the pericardium was derived.

The interior of the first and second portion of the arch was thickened and showed a few whitish scars with occasional grayish white, raised nodules. The rest of the aorta was unusually well preserved. There was a long split, three cm. in length, extending through the intima and media, at the base of which were the apertures through the adventitia on the outer surface of the vessel, as before described.

The third case was that of a woman, fifty-seven years of age, who had presented a clinical diagnosis of asthma and cardiac insufficiency. She died very suddenly while in bed at night. At autopsy, a right hemothorax was found. The aorta showed extensive atheromatous changes throughout. The calcareous plaques were not particularly numerous. There were numerous yellowish raised patches. Occasionally there could be seen yellowish, somewhat translucent looking scars, sometimes with radiating linear furrows. In the lower portion of the thoracic aorta, one cm. above the opening in the diaphragm, a slit-like aperture situated in the long axis of the vessel and communicating with the posterior mediastinum and right pleural cavity, was found. This rent went completely through the intima and media

to the adventitia, where a small dissecting aneurysm had formed before the rupture occurred.

A fourth case, showing a rather unique condition of the aorta, occurred in a German, forty years of age. He entered the hospital, complaining of ulcer on the right leg, of eight weeks' duration. This healed rapidly under anti-syphilitic treatment. He denied syphilis, but had suffered from gonorrhea eight times; besides the evidence of syphilis existing in his typical scars on the legs, he also presented a characteristic sinking of the bridge of the nose. He eventually developed, following urethral instrumentation, an acute vegetative endocarditis with a general septicemia, from which he died.

At autopsy, there was discovered an acute staphylococcal endocarditis with acute degenerative changes throughout the body. There was also an extremely enlarged spleen, weight 1,250 gms., and the liver was in a state of subacute cirrhosis. Just above the aortic valve, were three small, circular, punched out, deep ulcers, about three mm. broad, and extending through to the adventitia of the aorta. One of these ulcers led to a small aneurysm about one cm. in length and closely attached to the pulmonary artery, bulging somewhat on its inner wall.

These sharply punched out ulcers were very much like those which were found in the first case. Of course, the presence of an endocarditis in this case complicates it, as there is a possibility that some adherent vegetations might have caused these excavations.

Microscopically, the process causing these ulcers was evidently a chronic one; the elastic laminæ of the aorta were abruptly destroyed at the margins. As in the first case, no spirochetes were found in the ulcers of the aorta.

In conclusion, difficult as it is to draw very definite deductions in these cases, I think that there is some ground for stating that syphilis must be a very large factor in the production of conditions leading to rupture of the aorta and also of aneurysmal dilatation. Some of the cases I have demonstrated have shown ulcerations of the aorta practically independent of ordinary

atheroma and occurring in extremely syphilitic subjects. In deciding how far such rupture of the aorta can occur, independently of syphilis, I would invite the discussion of the Society.

Discussion:

Dr. Oertel pointed out as a promising field for discussion, the question of the relation of syphilitic disease of the arteries to general arteriosclerosis, and particularly to rupture of the aorta. Of particular interest to him was the fourth case reported by Dr. Detwiller, in which the small aneurysmal perforations were complicated by an ulcerative endocarditis of the aortic valve. The remainder of the aorta appeared to be in pretty good condition. The question arose whether these small, blind, and apparently healed perforations were the result of a very localized syphilitic disease or of inflammatory ulcerations.

Dr. James Ewing said that his idea about syphilitic aortitis was something which showed traces of the *Spirochaete pallida.* In the absence of this sign he felt it was hardly worth while sticking too closely to old teachings. It seemed to him, however, that the evidence in favor of the syphilitic nature of most of the lesions presented by Dr. Detwiller, and of the punched-out ulcers was rather strong. He thought there was great need of working over the whole subject of constitutional syphilis from the point of view of the demonstration of *Spirochaete pallida,* because these organisms have been found well preserved in very old lesions. The demonstration of even fragments of the *Spirochaete pallida* was of considerable importance, and could be made use of in many fields where no systematic attempt had thus far been made to demonstrate them. The appearance of the fragmented *Spirochaete pallida* was very characteristic. Feeling as he did, Dr. Ewing had been disappointed to learn that Dr. Detwiller had not succeeded in finding traces of the *Spirochaete pallida* in these lesions. Dr. Ewing was not disposed to think that all the diseases of the aorta which he had been taught many years ago were unquestionably spyhilitic were really of that origin. Again, he did not now believe that many of the characteristic lesions of the kidney, such as had been believed to be absolutely certain signs of syphilis, were really due to this disease.

PARATYPHOID CHOLECYSTITIS.

RUSSELL S. CECIL, M.D.

The striking similarity which exists between typhoid and paratyphoid fever holds true not only for their mode of onset and clinical manifestations, but also as regards the character of the complications encountered. Secondary paratyphoid infections of the bones, joints, testicle, middle ear, and bladder have all been reported; while, according to Lorraine Smith, intestinal hemorrhages occur in 5 per cent. of all cases.

The frequency of typhoid cholecystitis would, therefore, warrant the expectation of meeting often with gall-bladder diseases in paratyphoid fever. While such may be true, I have been able to collect from the literature only six authentic cases of paratyphoid cholecystitis. Lorey reported a case of paratyphoid cholecystitis, Type B, in 1908, and claimed that he could find in the literature no other cases of that type which were entirely free from objections.

The case of paratyphoid cholecystitis which I am about to report falls under the Type A group, and is especially interesting in that the patient gave no history of a previous attack of typhoid or paratyphoid fever.

L. C.; female, age twenty-five, married; admitted November 23, 1908, to the first surgical division of the Presbyterian Hospital, complaining of abdominal pain, nausea, and vomiting. Family history negative. Personal history negative. Measles in childhood. No other acute illness. No history of typhoid or paratyphoid fever. Present history: Two years ago patient was suddenly taken with severe colicky pains in gall-bladder region. Attack was accompanied with vomiting, fever, and slight jaundice. About one year later, patient had another attack, similar to the first. Since then she has been subject to frequent attacks. For the last three weeks she has been constantly ill. Pain is very severe and radiates to back. Nausea, headache, and fever constant.

Physical examination: Patient is fairly well nourished, but

looks ill. Chest negative. Abdomen is soft except in upper right quadrant, where there is some resistance. In the region of the gall-bladder there is a pear-shaped mass, moving with respiration, and slightly tender. Temperature, 101.5°; leucocytes, 12,600. Urine shows bile. Clinical diagnosis: Cholelithiasis.

On November 25 a cholecystectomy was performed by Dr. Eliot. At the operation, the omentum was found firmly adherent to the gall-bladder. Wall of gall-bladder was thickened; mucosa was swollen. Gall-bladder contained greenish, semiviscid bile, and numberless small stones. The bile ducts were patent. An abscess containing two ounces of pus was found near the foramen of Winslow. Microscopically, the mucus membrane of the gall-bladder is partially absent, and the other coats are densely infiltrated with polymorphonuclear leucocytes and lymphoid cells. Smears from the gall-bladder mucosa show many polymorphonuclear leucocytes, and small Gram negative bacilli. Cultures from the bile, and also from the interior of one of the stones, give a pure growth of an actively motile, Gram negative bacillus. On agar, this organism forms small greyish-white translucent colonies. Litmus milk is slightly acidified, but there is no coagulation or liquefaction after two weeks' growth. Neither blood serum nor gelatin is liquefied. In Dunham's peptone solution, no indol is produced. Broth becomes turbid, but no pellicle is formed. Glucose broth, 1 per cent. is fermented, with the production of a small amount of gas; saccharose broth is free from gas. In lactose broth there is at first no gas, but at the end of a week there is a minute bubble. In mannit broth a small bubble after several days. One cubic centimeter of the twenty-four hour broth culture, when injected intraperitoneally, killed a guinea-pig in less than twenty-four hours. Agglutination tests with patient's serum were carried out with a number of organisms. The typhoid bacillus was not agglutinated, even by high concentrations of the patient's serum The colon bacillus was not agglutinated at a dilution of 1-20.: The patient's own organism was agglutinated at a dilution of 1-200. Two other strains of paratyphoid bacillus, Type A, were agglutinated at a

dilution of 1-50, both microscopically and macroscopically. Two strains of Bacillus paratyphosus, Type B, were not agglutinated at a dilution of 1-20.

On December 12, seventeen days after the operation, the patient's feces were examined for paratyphoid bacilli. Endo's medium was used for the plates. No paratyphoid bacilli were found.

In this case we have the picture of a typical chronic cholecystitis, produced by an organism which corresponds in every way with Kayser's paratyphoid A bacillus. This case bears a striking resemblance to the one reported by Blumenthal. His patient, a woman forty-six years old, gave no history of typhoid or paratyphoid fever. At the operation there were found thirty-six gall-stones, cultures from which gave a pure growth of the paratyphoid A bacillus. The agglutination test was positive at a dilution of 1-300.

In 1903, Pratt reported a case of cholelithiasis in a girl, eighteen years old, who was operated on four years after an attack of fever diagnosed as typhoid. Cultures from the gall-bladder and from the stones gave a pure growth of the paratyphoid B bacillus. The patient's serum agglutinated her own organism, but had no effect on the typhoid bacillus.

Lorey's case is similar to Pratt's. A young man, twenty-two years old, giving a history of typhoid fever two years previous to his attacks of gall-stone colic, underwent an operation. Four stones were found in the gall-bladder. Cultures from the gall-bladder mucosa showed a pure growth of the paratyphoid B bacillus. The patient's serum agglutinated his own organism, as did also the serum from two cases of paratyphoid fever.

Zimmer has recently reported a case of paratyphoid cholecystitis which was diagnosed from a bacteriological examination of the feces. The paratyphoid B bacillus was isolated. This organism was agglutinated by the serum from a case of paratyphoid fever, but the patient's serum failed to agglutinate his own organism. There was no surgical or post-mortem examination in this case.

Forster and Kayser examined the bile of one hundred and forty-eight cadavers for bacteria, and found the paratyphoid bacillus only once, and that in a case of diabetes mellitus. The gall-bladder contained two stones. The bile gave a pure culture of the paratyphoid B bacillus, but cultures from the interior of the stones were sterile. In this case there was no history of typhoid or paratyphoid fever. The identity of the bacillus was established by "the usual cultural and immunity reactions."

In addition to these five cases of paratyphoid cholecystitis, several observers have found paratyphoid bacilli in gall-bladders that showed no pathological changes. Dr. Libman, as far back as 1902, isolated the paratyphoid bacillus from the gall-bladder in a case of paratyphoid fever which was operated on for suspected gall-bladder disease. The gall-bladder was distended with thick, dark bile which could not be pressed out. After the operation intense jaundice developed and the patient died on the following day. At the autopsy, however, the gall-bladder and bile ducts showed no changes.

Luchsch has reported a case of paratyphoid fever that came to autopsy. Cultures from the bile showed the organism, but there were no inflammatory changes in the gall-bladder.

Discussion:

Dr. E. Libman said that the case to which Dr. Cecil had referred was considered before operation to be a case of cholecystitis. At the time of the operation there was slight jaundice, high temperature, and marked tenderness in the region of the gall-bladder. At the operation the gall-bladder was found distended with bile; the wall was absolutely normal, both macroscopically and microscopically. There were parenchymatous degeneration of the liver and a deposit of fibrin on the surface near the gall-bladder. This recent perihepatitis had caused the symptoms which suggested an involvement of the gall-bladder.

As regarded the method of elimination of bacteria through the bile, Dr. Libman stated that he had observed one case which

suggested that sometimes there may be such an elimination of bacteria from the liver through the bile without the bacteria first entering the general circulation. He cited a case of suppurative pylephlebitis due to streptococci, in which although the blood cultures were negative, streptococci were found in the gall-bladder. A case of paratyphoid cholecystitis had recently been observed in Mt. Sinai Hospital, and this case had been studied by Dr. Rosensohn, the pathological interne, who would state his findings.

Dr. Rosensohn said that at Dr. Libman's suggestion he had looked through the records of the laboratory from April, 1904, up to the present time, and had found records of 257 bacteriological examinations of the contents of gall-bladders. In nine of these cases typhoid bacilli were found in the bile, and in one case the paratyphoid bacillus was found. The patient from whose gall-bladder the paratyphoid organism was isolated was a woman forty years of age. Some fifteen years before her recent illness she had been in bed two weeks with a disease which was diagnosed as typhoid fever, and which was very mild in character. Three or four years after that time she began to suffer from attacks of jaundice and pain in the region of the gall-bladder, being perfectly well between the attacks. During the past summer the patient was seized with intense pain in the region of the gall-bladder, and developed high temperature and marked jaundice. She was treated by Dr. Manges who referred her to Dr. A. A. Berg for operation. The gall-bladder was found very markedly distended, being about the size of a fist. The bile which was aspirated was described by Dr. Berg as being of peculiar color, resembling methylene blue. Dr. Berg said that he had never before seen exactly that color in a fluid obtained from the gall-bladder. The paratyphoid organism which was isolated from the bile was typical in its character. Milk was only slightly acidified; there was no secondary alkalinity. Unlike Dr. Cecil's organism no gas was produced in lactose. The mucous membrane of the gall-bladder was thickened; no material was sent to the laboratory for microscopical examina-

tion. The gall-bladder, common duct, cystic duct, and some of the hepatic ducts were filled with calculi. The gall-bladder was removed and the patient made an uneventful recovery. The serum of the patient had no agglutinating effect upon the typhoid bacillus, but agglutinated the paratyphoid organism which was isolated from the bile in dilutions up to 1-100.

Dr. Charles Norris was under the impression that in the course of ordinary routine examinations of bile in his laboratory, they had had several cases from which paratyphoid organisms had been cultivated; at least two or three in the last four years. It would probably be determined through extensive routine examinations in time, that the paratyphoid bacillus, while not found so frequently as the colon, was present in a large number of cases. As had been shown, it was a more or less constant inhabitant of the upper portion of the gut. In autopsies on cases of meat poisoning due to paratyphoid-like organisms and also in typhoid fever, the organisms were always found in large numbers in the bile. Dr. Cecil had said that his organism after a considerable number of days produced only a bubble of gas in mannit and caused only slight acidification of milk. In Dr. Norris' experience with these organisms, paratyphoid and paracolon bacilli produced abundant gas in mannit, and gave only a primary and temporary acidification of milk. If the milk were left in the incubator there was a strong alkali production. He would rather question whether the organism which Dr. Cecil had described was really a paratyphoid bacillus.

Dr. Cecil, referring to the point brought up by Dr. Norris, the action of the bacillus on milk, said that he had observed this carefully, as he was familiar with the usual action on milk. In several tests there was only faint acidity produced with no change after a few days. Recently he had re-tested the bacillus, and had found that it still formed a very faint acid reaction which did not become alkaline. The agglutination reactions were so marked that it was impossible to feel any doubt as to the nature of the organism.

SUDDEN DEATH IN CONSTITUTIONAL SYPHILIS DUE TO EXTENSIVE SYPHILITIC LARYNGITIS.

A. K. DETWILLER, M.D.

The specimen presented was removed from a comparatively young man, twenty-seven years of age, who gave a definite specific history, stating that his primary lesion had occurred in October, 1906. This was followed by a secondary eruption and throat symptoms. He had been under constant treatment since that time. Eighteen months after the primary lesion he was admitted to the City Hospital with very extensive tertiary lesions. He had four deep ulcerations on his forehead and considerable destruction of the cartilaginous portions of his nose. He was put on antisyphilitic treatment, several hundred grains of iodide being given daily. After a year of such treatment he was discharged, but was still employed about the hospital as an orderly. For the last few months he was troubled with severe specific laryngitis, which began with husky voice, ending in complete loss of phonation. He also began to suffer with attacks of dyspnea which occurred at special times, as when he was required to do some heavy lifting, or go up a flight of stairs. During one of these so-called "asthmatic" attacks brought on by running up a flight of stairs, he suddenly became cyanotic and died in a short time. The physician who saw him thought the cause of death was acute dilatation of the heart or possibly ruptured aneurysm. At autopsy there was nothing to account for his sudden death except a nearly complete stenosis of the lower half of the larynx. In addition there was found extensive destruction of the cartilaginous portions of the nose. On one side of the face was a large shiny scar which began at the angle of the mouth and reached to the temple; there were also several scars over the forehead. The base of the tongue showed a rather hypertrophic condition of the papillæ, some of which were greatly swollen. The epiglottis was almost completely ulcerated away, only a small stump remaining. There was marked thickening of the arytenoepiglottic folds due to the extensive infiltration. At the time

of autopsy some edema was present. Examination of the under surface of the larynx showed that the cellular infiltration extended down to the fifth ring in the trachea. A cross section just beneath the vocal cords showed a very striking stenosis, which in the unhardened specimen had been almost complete. The tissue was very dense and firm.

The liver presented numerous gummata, some on the surface, and some in the interior of the organ. Some areas were caseous and others were quite hard. The abdominal aorta was comparatively well preserved, smooth and glistening throughout, except that along its posterior wall there were some fine light linear markings, possibly a part of his constitutional disease, namely, a beginning syphilitic aortitis. A series of lantern slides was presented showing the lesions in question very clearly.

THE MARESCH METHOD FOR STAINING TISSUE SECTIONS.*

WILLIAM H. WOGLOM, M.D.

In 1905, Maresch[1] published a modification of the stain of Bielschowsky and Pollak[2] for neuro-fibrillæ, which he recommended highly for the demonstration of fine connective fibers, such as one finds in the liver and in the lymph nodes, and for the study of the same fibers in tumors. These fibers appear in the sections an intense black. His technique is, in short, as follows:

Formalin fixed tissues are embedded in paraffin. After cutting, they are floated out on warm 2 per cent. silver nitrate solution, in which they remain for twelve to twenty-four hours.

*Read by Dr. F. C. Wood.

[1]*Centralbl. f. allg. Pathol.*, xvi, 1905, 641.

[2]*Neurol. Centralbl.*, 1904, 387.

After a thorough washing in distilled water, they are transferred to the following solution, which must be freshly prepared:

2 per cent. silver nitrate solution.....20 c.c.
40 per cent. sodium hydrate solution..... 3 drops
Ammonia.....Enough to dissolve the precipitate

After two to thirty minutes in this solution, the sections are washed in distilled water, and then reduced in 20 per cent. formalin. Reduction takes place almost instantly. After washing in distilled water, the sections are transferred to an acid gold toning bath:

Distilled water .....10 c.c.
1 per cent. aqueous sol. gold chloride..... 3 drops
Glacial acetic acid..... 3 drops

In this they remain for about ten minutes, at the end of which period unreduced silver can be removed by immersion for one-half minute in a 5 per cent. solution of hyposulphite of soda. The sections are then floated out on warm water and mounted on glycerin-albumin covered slides. After the sections are dry the paraffin is removed with xylol, and the sections mounted in damar.

Celloidin sections may be used, in which case it is well to dissolve out the celloidin before impregnation. The technique for frozen sections is essentially the same as that for paraffin sections.

In 1909, Kuro, at the meeting of the Deutsche pathologische Gesellschaft,[3] described the differentiation between sarcoma and carcinoma by means of this stain. In carcinoma, fine fibrils are never found between the cells as they are in sarcoma. These fibrils are stained an intense black, while the ordinary collagen fibers take on a more brownish tone.

Stimulated by the illustrations accompanying this article, we tried the method on a variety of tissues. Fibrin and elastic tissue do not take on the intense black which is assumed by the connective tissue fibrils, but are rather brownish in their tone.

[3] *Verhandl.*, 1909, 386.

The method affords a striking and beautiful demonstration of even the very finest fibrils in the liver, in the lymph nodes, and in malignant growths. Considerable difficulty was experienced in impregnating frozen sections, and as there seemed to be no advantage in their use the attempt was given up, and thin paraffin sections were used exclusively. As there was a great deal of shrinkage in the sections which had been for twelve to twenty-four hours in silver nitrate, and as the whole section was often too black to be of any real use, it seemed advantageous to shorten the time. It was found that five minutes in silver nitrate was enough to demonstrate the fibrils, while at the same time shrinkage was to a great extent eliminated, and the details of the nuclei and cell bodies became much more evident. Whether sections prepared by thus shortening the time will be as permanent as the others, it is impossible to say. The only other change which has been made has been to fasten the sections to the slides before staining is begun. Sections from which the paraffin has been removed before staining seem to stain, on the whole, more regularly than those which are carried through the process with the paraffin still present. There is great danger, however, of their coming off the slide, although the use of a thin film of celloidin would probably obviate this difficulty.

A considerable series of tumors have been stained by this method and show a variety of interesting appearances. In the carcinomata one finds black fibrils which pass around small nests of epithelial cells but do not penetrate between them. In the true sarcomata each cell is generally paralleled by fine fibrils. The cells of the mixed tumors of the salivary glands do not usually show fibrils between them. Certain of the tumors coming from pigmented moles have shown connective tissue between the cells; others have shown none. The results with certain other obscure forms of malignant new growths have been somewhat doubtful. Occasionally one will see the periphery of the cells stained, giving the appearance of an intercellular fibril network. Probably, however, this is a staining of the intercellular cement substance. On the whole, the silver method is of considerable practical value

in aiding in the differentiation between carcinoma and sarcoma; but there is not infrequently much difficulty in getting suitable stains, and the results are quite inconstant as to the depth and extent of the fibril stain. While, therefore, it is a useful adjuvant to our diagnostic methods, it is by no means a certain clue to tumor nomenclature.

THROMBOSIS OF THE LEFT JUGULAR AND SUBCLAVIAN VEINS.

H. LE B. PETERS, M.D.

This specimen of thrombosis of the left jugular and subclavian veins, with agonal extension to the right ventricle in mitral stenosis was from a woman, thirty-eight years of age, who was admitted to Dr. N. B. Potter's service at the City Hospital on October 26, 1909, complaining of "shortness of breath, weakness, and palpitation of the heart." Her symptoms dated back to April, 1909, when she had apparently suffered from a typical attack of acute rheumatic fever. During that time, she had considerable dyspnea, especially upon slight exertion, palpitation, a hacking cough, some cardiac distress, and marked engorgement and pulsation in the veins of her neck. These symptoms improved somewhat under treatment in Bellevue Hospital, only to recur shortly after her discharge. The only point of importance in her previous history was repeated attacks of rheumatism, extending over a period of twenty years.

On admission, she was found to have typical signs of mitral stenosis, with a failing compensation, a large heart, presystolic thrill, presystolic and systolic murmur at apex, an irregular pulse, and a marked distention of the veins of the neck with positive venous pulse. On December 2, about three weeks before death, the patient complained of pain in the left side of the neck and in the left axilla. The upper part of the left arm was

swollen and tender; and what was taken for the left subclavian vein was hard, tender, and hot. This acute condition lasted only about two days and then subsided. Subsequently, the lower part of the left jugular vein was felt to be hard, as was also the left axillary vein. Her heart condition became gradually worse and she developed a general edema. The edema was much more marked in the left than in the right arm.

The temperature, from November 20 until her death, on December 23, 1909, was irregular, ranging from 98° to 102°. The blood count on December 1, one day before the thrombosis was first noted, was 3,384,000 red blood cells, 60 per cent. hemoglobin, 14,000 leucocytes.

Autopsy: The heart was large, weighing over 700 gms. The mitral orifice admitted only the tip of one finger. The other valves were apparently healthy. From the junction of the left jugular and subclavian veins, extending 20 to 25 cm. through the subclavian, axillary and brachial veins, and about 12 cm. up the left jugular vein, was a thrombus (of the mixed variety) firmly attached to the vessel walls and apparently completely obstructing the lumen of the veins. From the junction of the left jugular and subclavian veins, a white thrombus of smaller caliber extended through the left innominate and superior vena cava, ending in a large, bulb-like projection in the right auricle. This was quite firmly attached near the point of division of the left innominate, but was otherwise not adherent to the walls of the vessel nor in the right auricle. The intima of the superior vena cava, not involved in the thrombosis, was smooth and glistening, as were also the veins of the right side, and the brachial vein distal to the region involved in the thrombosis.

Microscopical Examination: A section of vein from apparently the oldest part of the thrombosis showed considerable thickening and some inflammatory change, but it was impossible to determine from the section whether the vascular change was primary or subsequent to the thrombus formation. The thrombus itself was undergoing considerable organization.

The mixed thrombus was probably of three weeks' dura-

tion, forming at the time of her symptoms; while the other, on account of its character and its slight adhesion to the vessel wall, appeared of more recent and probably agonal formation.

The case is interesting on account of its comparative infrequency—a relatively small number of cases of peripheral thrombosis in cardiac disease having been reported.

Hanot and Kahn, in reporting a similar case, could find only five others in the French literature. Welch, in 1900, was able to collect in all a report of twenty-seven cases, while since that time Desquiens, in 1906, has collected thirty-nine cases.

Of Welch's twenty-seven cases, twenty-three attacked the veins of the neck, upper extremity, or both. Of the twenty-three cases, fourteen were confined to the left side, seven were bilateral and in only two were the veins of the right side exclusively affected. Of Desquiens' thirty-nine cases, thirty-seven involved some branch of the superior vena cava. The comparative frequency with which the upper extremity is involved in the condition is rather remarkable, when we consider that venous thrombosis from all causes is said by Bouchet to be fifty times more frequent in the lower than in the upper extremity.

According to Welch "The associated valvular disease of the heart is almost invariably mitral—stenosis, with or without incompetence, taking the lead."

The cause of thrombosis in cardiac disease is still a matter of discussion. Hanot and Kahn attribute it to the cachectic state during the last stages of cardiac diseases. Poynton, in discussing three cases reported by Cheadle and Lees in 1898[1], refers the thrombosis to a rheumatic phlebitis, although bacteriological examination was negative. Two of these cases showed a mitral stenosis, and the third an acute mitral endocarditis of rheumatic origin.

Schmidt considers the thrombosis due simply to stasis, while Letulle and Gatay[2] hold to rheumatic phlebitis as the cause.

[1] *Lancet*, July, 1898.

[2] Gatay, La phlebite rhumatismale. *Gaz. hebd. de méd.* Feb., 1896.

Welch thinks that the most probable cause is a terminal infection, and that the localization is due to the pressure, direct or indirect, of the left auricle and engorged pulmonary vessels on the left innominate vein.

Discussion:

DR. CHARLES NORRIS asked whether there had been any infection of the left arm in this case.

DR. PETERS said that there had not.

OBSERVATIONS ON THE ANTIFORMIN METHOD FOR THE DETECTION OF TUBERCLE BACILLI AND THE VALUE OF THE HERMAN STAIN.

CHARLES KRUMWIEDE, JR., M.D., AND LOUISA P. BLACKBURN.

(*From the Research Laboratory, Department of Health, New York.*)

Numerous efforts have been made to perfect a method by which sputum, negative for tubercle bacilli by direct smear, can be fluidified so that subsequent sedimentation, by gravity or centrifuge, will concentrate the bacilli, if present, and render detection easier. No satisfactory method had been evolved till Uhlenhuth[1], in 1908, advised the use of antiformin, a hypochlorite solution with sodium hydrate added, as the solvent agent. While testing its disinfectant and solvent powers, he found that not only were nearly all bacteria quickly killed and dissolved by it, but numerous organic substances were attacked. On trying its effect on tuberculous sputum, this was found to be quickly fluidified; but within limits neither the staining properties nor the viability of the tubercle bacilli were affected. In general, the following method has been used, the variations being in time of action and strength of antiformin used.

The sputum is mixed with antiformin so that the total

strength of the latter is 15 per cent. After vigorous shaking, the mixture is allowed to stand until completely fluidified, which will depend on the character of the sputum. The specific gravity of the mixture is then reduced, if necessary, by adding water or alcohol to facilitate sedimentation and the fluid centrifuged for one-half hour. The supernatant fluid is then poured off and the sediment shaken up in water and recentrifuged. This washing is necessary, as otherwise the material does not spread well on the slide, and staining is interfered with. After pouring off the water, smears are made from the sediment and stained. The results, as reported by Uhlenhuth, Hüne,[2] Thilenius,[3] Seeman,[4] and Meyer,[5] have been very good. The last reported 14 per cent. positive results with negative sputa, in some instances the sputum for twenty hours being used and only three or four bacilli found.

Previous to the introduction of antiformin, Lange and Nitsche[6] had found that if a hydrocarbon be added to fluidified sputum and thoroughly shaken, as the hydrocarbon rises again it carries up the tubercle bacilli which will be found at the junction of the two fluids when the emulsion clears. They suggested the use of ligroin and advised this method as a substitute for centrifuging. The clearing of the emulsion and rise of the ligroin are aided by standing the mixture in the incubator or in a water bath at 60° C. Smears are made by taking repeated loopfuls of material, at the junction of the two fluids, and placing them on the same spot on a warmed slide. Practically nothing stains except tubercle bacilli.

Haserodt,[7] and later Bernhardt[8] and Jacobson[9] applied the ligroin procedure to the antiformin treated sputum with good results. Haserodt used both methods on 300 negative sputa with 7 per cent. positive results. On the ground of comparative results with twenty sputa prepared by mixing different samples, he comes to the conclusion that the ligroin method is more favorable than centrifuging.

We have examined the following specimens of sputa to judge of the practicability of the antiformin method as a rou-

tine method of diagnosis and incidentally to compare the crystal-violet (Herman)[10] and carbol-fuchsin stains.

Twenty-eight sputa considered negative by the diagnostic laboratory and five sputa containing varying numbers of tubercle bacilli were examined. The method consisted in diluting antiformin with two parts of water, adding an equal volume to the sputum, shaking a few times and allowing the sputum antiformin mixture to stand over night. The resulting homogeneous mixture was then treated as already described, using the centrifuge method.

The carbol-fuchsin stained smears were decolorized and counterstained in Pappenheim's solution; the crystal-violet stained smears were decolorized in 10 per cent. nitric acid, rinsed in alcohol, and counterstained in Bismark brown. Where smears are said to have been restained with carbol-fuchsin, the heating was prolonged to about three minutes, the slide decolorized as in the crystal-violet method, and simply dipped in methylene blue (1 per cent.) to render the counterstain very light.

In all cases the duplicate slides were made from the same material, carrying it from slide to slide with careful mixing, rendering them as uniform as possible. We have considered these slides as identical, which naturally cannot be the case, but the final average would rule out accidental variations in the individual slides.

Of the twenty-eight negative sputa examined two were positive, on less than five minutes' search, in slides made directly from the sputum. Of the remaining twenty-six, four were positive in the sediment alone; that is, 15 per cent. positive results with the antiformin.

The first two sputa were also negative with us, after painstaking search of carbol-fuchsin preparations. In one case the sediment was also negative with the carbol-fuchsin stain, but bacilli very numerous with the crystal-violet stain. All the carbol-fuchsin slides were then restained and the bacilli easily found, though even then the preparations were not quite as good as those stained with crystal violet. In other words, if these ex-

aminations had been controlled with crystal-violet stain, a few minutes' search would have shown them positive.

Of the four specimens which were positive in the sediment alone, the carbol-fuchsin stain failed, though the crystal-violet stain revealed bacilli. On restaining the carbol-fuchsin slides, however, bacilli were found in three of the specimens, though decidedly fewer in number. The results in the fourth specimen were probably accidental, due to difference in number of bacilli on the individual slides. This leaves no doubt as to which is the better stain.

Five control specimens were examined to confirm the above findings and to see the relative merits of slight modifications of technique.

In three specimens the concentration was over one hundred fold in the sediment. Comparative counts showed more bacilli in the sputum stained with crystal violet, and in using the sediment the carbol-fuchsin slides were very poor and required restaining. The use of alcohol to reduce the specific gravity of the antiformin sputum mixture was tried and gave better sedimentation and clearer and better stained preparations.

The ligroin method was tried both on positive and negative sputa. The results in the few instances we have tried it have not been as good as with the centrifuge method. It failed where the centrifuge method was positive.

The amount of sputum used in the centrifuge method has been from three to seven c.c.

From the comparative work done we conclude that every sputum should be examined with the crystal-violet stain, if negative with carbol-fuchsin. Further, that as a routine procedure one volume of the antiformin-sputum mixture to one or two volumes of alcohol, depending on the character of the mixture, will give the best results, and in the ordinary centrifuge tube will give sufficient sediment for two slides, which, if stained with crystal violet and found negative, can be considered negative. Larger volumes of sputum would give better results probably, but more smears would be required and the time consumed would be pro-

hibitive except in special instances. The guinea-pig would be cheaper if slower.

As to the difficulty with the carbol-fuchsin stain, possibly two factors are at work, the decolorizing action of methylene blue, and overstaining and blotting out of fuchsin stained bacilli. Very light staining with methylene blue, just sufficient to clear the field and give a contrast, should be done. If other organisms are to be observed a second preparation had better be made.

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[8]Bernhardt: *Deut. med. Woch.* 1909, No. 33.
[9]Jacobson: *Comptes Rend. Soc. de Biologie.* Tome LXVII, No. 32.
[10]Herman: *Ann. Inst. Pasteur.* Tome XXII, No. 1.
(See also Caan, *Cent. f. Bakt.* Orig. Bd. XLIX, s. 637, for comparison of newer staining methods.)

Discussion:

Dr. Hans Zinsser asked Dr. Krumwiede what results he had had in the cultivation of the bacilli after treatment with antiformin. This method had been used in a few cases at St. Luke's Hospital laboratory, with excellent results in morphological study alone, where the bacilli were found after centrifugalization in enormous numbers. Although not done systematically, two or three attempts to cultivate these bacilli had failed. It was a question whether the failures were due to the fact that the bacilli were not washed long enough after the treatment, or to the fact that they had been exposed too long; or whether the cultivation of the bacilli was not so easy as Uhlenhuth had stated in his first communication.

Dr. E. Libman said that he had had an interne working

with the antiformin method at Mt. Sinai for a couple of months, so far with very excellent success. He thought that one great advantage would be apparent in animal inoculation work. Inoculated animals were often lost because of infection with other organisms. Here there was a method available for eliminating the contaminating organisms before inoculation. Dr. Libman also said that while visiting at Saranac Lake last summer, Dr. Brown had shown him a number of successful cultures made after the antiformin method. He had apparently had no difficulty in cultivating the organisms.

Dr. F. C. Wood said that he had used the Herman method in staining sections with great satisfaction. At least, one could find, in presumably tuberculous tissue, bacilli which were not demonstrable by the ordinary carbol-fuchsin tissue stains. He had not used it, however, in staining sputa, as he had always considered the carbol-fuchsin stain with differentiation in Pappenheim's solution quite satisfactory.

Dr. Richard M. Pearce said that he had had no experience with this method. He thought, however, that it was a mistake to exploit in a scientific paper any preparation under a proprietary name. He understood that this substance had been known to chemists for years; and in these days of crusades against proprietary articles it seemed a mistake to exploit this preparation in this way.

Dr. A. F. Hess said that he had given to the pharmacists at the Board of Health laboratory the exact prescription for this substance according to Uhlenhuth's formula, but the results obtained were not at all the same. Evidently the solution was quite different. Possibly the preparation could be made, but their attempt had been a failure.

Dr. Krumwiede, in answering Dr. Zinsser, said that he had failed also in the attempt to make cultures, though he had not given much time to the matter. The antiformin seemed to affect the viability on culture media, even though animal inoculations might be positive. Uhlenhuth says not to expose the bacilli to antiformin any longer than necessary. He advises contrifugal-

izing immediately after the sputum is fluidified. As regarded the proprietary phase of the subject, Dr. Krumwiede said that he, too, had tried to compound the formula which was given to him, but that he could not get the same results. Uhlenhuth claims that a further advantage is the keeping quality of antiformin.

A CASE OF SEPSIS DUE TO BACILLUS PYOCYANEUS.

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It is not so many years ago that there was doubt as to the occurrence of a primary sepsis due to *Bacillus pyocyaneus*. During the past few years, however, several cases of this nature have been reported, where this organism has been cultivated from the blood during life, as well as recovered from the various organs after death. The cases are not so numerous, perhaps, as to make it inappropriate to report in brief an additional instance which has come to my attention.

The patient was a girl, almost three years of age, one of three children of healthy parents. She had always been well until four days previous to the time when I first saw her. The mother stated that during these days the child had suffered from a moderate diarrhea, with slimy stools accompanied by malaise and fever. The case was considered by me to be one of indigestion, and castor oil and a fluid diet were prescribed. Two days later the child was again seen by me, but no unusual symptoms were noted. She did not look as well; the temperature was 101° F.

On the following day some petechial spots were noted on the palpebral conjunctiva, as well as on the body, and, as the patient's general condition was worse, a blood culture was taken. Three cubic centimeters of blood were obtained from the vein at the elbow, under strict aseptic precautions, and injected into

flasks of broth and glucose broth. In these a pure culture of *B. pyocyaneus* developed. One-half cubic centimeter of a forty-eight-hour broth culture of this organism was fatal to guinea-pigs when inoculated intraperitoneally.

The further clinical history is as follows: The child lived six days from the date of the taking of the blood culture. She grew rapidly weaker; large subcutaneous hemorrhages developed upon the trunk and the extremities, some containing pus; the diarrhea persisted, five to eight stools being voided in the course of the day. The stools had a peculiar fetid odor, and were composed largely of pus and mucus tinged with blood. The temperature ranged between 99° and 104°. The day previous to the fatal exitus, the right ear showed a discharge of thick yellow pus. Physical examination of the child disclosed nothing additional, excepting enlargement of the spleen and more especially of the liver.

As has been mentioned, *B. pyocyaneus* was cultivated from the blood during life. In addition, it was isolated from the urine, from the aural discharge, and from one of the skin lesions which contained bloody pus. It was also cultivated from the heart's blood which was aspirated post mortem. No further autopsy was allowed.

We seem to have here undoubtedly a case of general infection due to *B. pyocyaneus* as the primary and sole invader of the system. The portal of entry appears to have been the intestine, so far as we can judge from the early symptoms. The nature of the invading organism could not have been diagnosed nor, I believe, even suspected from the clinical course, as the pus in the aural discharge, in the skin lesions, and in the stools did not present the characteristic color. The etiology of the infection remains obscure.

Discussion:

Dr. E. Libman considered this case one of the most interesting cases of general pyocyaneus infection which had been reported. The fact that the discharge did not have the usual yel-

low color was particularly interesting. In infections of the middle ear by *B. pyocyaneus* the first pus is usually white and does not have the characteristic odor; but after discharging for a time, the typical color is usually developed; that is, as soon as the external air gains access to the ear the real color of the pus is produced. Dr. Libman had had three cases of general infection by *B. pyocyaneus,* all of which were interesting. The first case was in a patient who had had an attack of acute febrile icterus. In his blood *Staphylococcus pyogenes aureus* was found. The patient improved and was fairly well for about a week, when he again developed severe symptoms, and *B. pyocyaneus* was found in the blood. After death the same bacillus was found in the heart's blood. *Staphylococcus aureus* was found in an abscess of the vastus externus muscle. The infection by *B. pyocyaneus* was a secondary one. The second case was simply an ante-mortem infection. The third case had occurred within the last few months, and was one of the very few definite cases in which recovery followed. The patient entered the hospital with a severe cystitis which had persisted for some time. After instrumentation he developed chills and a temperature. *Bacterium coli* was found in the blood; a few days later both *Bacterium coli* and *B. pyocyaneus* were found. Cultures of the urine also showed both. A third blood culture showed *B. pyocyaneus* alone. The patient made a complete recovery.